Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Section 90.20(e)(6) of the	)	WT Docket No. 06-142
Commission's Rules	)	RM-11135

REPLY COMMENTS OF LOJACK CORPORATION

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SUMMARY

In this filing, LoJack replies to the comments filed by MSTV/NAB, ABC, and CDE, which are limited to the issue of whether LoJack's proposals adequately protect viewers against interference to Channel 7 reception.

DTV Testing. Based on extensive industry testing that already has been conducted, LoJack shows that Channel 7 television stations will gain at least 10 dB in additional interference protection, and likely more, when they convert to digital operations. The power increases proposed by LoJack are less than 10 dB. Accordingly, even if these power increases are adopted, DTV signals will enjoy greater protection than analog signals enjoy now under the power levels that are currently permitted.

Using Higher Power to Compensate for Narrower Channels. The technical analysis LoJack submitted with its initial comments resolves questions raised by MSTV/NAB and ABC. It shows that the 2.2 dB and 3 dB power increases LoJack has sought for SVRS base stations and VLUs are needed, and in fact will only partially compensate for the degradation associated with the required conversion to narrower SVRS channels.

Eliminating the Requirement for Formal Channel 7 Interference Studies. The other parties' objections to the proposal for eliminating the requirement to submit a formal Channel 7 interference study with every application for an SVRS base station are without merit. Digital television is less susceptible to interference from SVRS, not more. The time long has passed for asking the Commission to reconsider its existing interference protection criteria. A formal interference showing is not a prerequisite to addressing the potential for interference before it occurs. Viewers may not know the

source of interference they are subject to, but they know enough to complain to their local television station or cable operator if interference becomes an issue. And there are alternative means for mitigating interference if notch filters are determined to be less than completely effective.

Duty Cycle Revisions. LoJack shows ABC's objections to the proposed duty cycle revisions to be incorrect. There has been a change in circumstances since the Commission last addressed this issue; LoJack must operate side-by-side systems during the lengthy transition to narrower channels. And the Commission resolved many years ago ABC's questions concerning the adequacy of the current duty cycle limits.

Number of Mobile Units. MSTV/NAB's claim that large numbers of mobile SVRS transmitters pose the threat of a "steady-state or near steady state interfering signal" is misplaced. The only mobile units that transmit are the ones installed in a vehicle that has been reported stolen, and on average LoJack activations per day are limited to approximately 40 mobile units.

Expansion of Permissible Services. Contrary to the claims of MSTV/NAB and ABC, the additional SVRS uses proposed by LoJack are narrowly circumscribed, and in particular they all involve activation, tracking, and location communications, under the control of law enforcement entities, in response to an emergency event. Moreover, even if the number of activations were to increase to several times the current figure of 40 per day as a result of an expansion in permissible services, the number of mobile units in operation would remain small, and in almost all locations there would be no mobile units in operation at any given time.

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LoJack Corporation ("LoJack"), by its attorneys, hereby replies to the comments that have been filed by the other parties in the above-captioned proceeding.[1]

I. INTRODUCTION

In its initial comments, LoJack supported, with suggested modifications, the Commission's proposals in the NPRM. LoJack advocated an increase in SVRS mobile station output power from 2.5 watts to 5 watts, and in SVRS base station ERP from 300 watts to 500 watts. It asked that SVRS licensees be permitted to use any emission designator. It supported the liberalized duty cycles that the Commission proposed and asked that the revised duty cycle for VLUs apply to all VLUs, not just VLUs operating with a 12.5 kHz bandwidth. It sought the elimination of the requirement for formal Channel 7 interference studies. It supported licensing by rule for SVRS base stations that are not associated with licensed based stations. And it requested that the services SVRS stations are permitted to provide be expanded consistent with the law enforcement purposes underlying the SVRS rules.

The sole issue raised by the other parties is whether these proposals adequately protect viewers against interference to Channel 7 reception. No party disputes that the changes sought

will make SVRS operations more efficient and effective. None takes issue with the fact that additional power will compensate for a reduction in performance resulting from squeezing SVRS signals into narrower channels, and that more liberal duty cycles will facilitate side-by-side operations of dual wideband and narrowband SVRS systems during the multi-year transition from wider channels to narrower channels. None contests that permitting law enforcement authorities to use SVRS channels for additional location and tracking purposes will enhance the authorities' ability to meet their public safety mandate. And none opposes the proposals to permit operations employing different types of emissions, including digital emissions, and to implement licensing by rule.

For the reasons discussed in this reply, the other parties' concerns with potential interference to Channel 7 reception are misplaced. The additional technical analysis that LoJack submitted with its initial comments resolves the principal technical issues these parties have raised. Other matters the parties have raised were considered and disposed of by the Commission when it first adopted SVRS rules. There is no reason to revisit them now. LoJack's proposals provide ample protection for Channel 7 viewers and, in light of the undisputed public interest benefits that are associated with the proposals, the Commission should adopt them expeditiously.

II. DTV TESTING ALREADY HAS BEEN CONDUCTED.

MSTV/NAB takes the position that, in order to determine what level of SVRS power increase can be accommodated by digital television receivers tuned to Channel 7, "LoJack should be required to conduct laboratory tests using SVRS test transmitters and various

[1] In addition to LoJack, the following parties filed comments: Cohen, Dippell and Everist ("CDE"), the Association for Maximum Service Television, Inc./the National Association of Broadcasters ("MSTV/NAB"),

consumer grade DTV tuners."[2] MSTV/NAB's position is based on the fact that the Micrologic Report the Commission relied on when it adopted the SVRS rules was developed in the context of analog television signals.[3] MSTV/NAB believes that, given its analog television roots, the Micrologic Report cannot be applied in a DTV context.

LoJack agrees that the Micrologic Report is not directly applicable to a DTV interference analysis. As a result of testing that already has been conducted, however, one can convert the protection ratios for analog television in the Micrologic Report, which the Commission relied on long ago when it was considering the possibility that analog television signals could be subject to interference from SVRS transmissions, to protection ratios for digital television.

As discussed in the attached engineering statement, there has already been extensive testing in the industry to evaluate the differences in susceptibility to interference between analog television signals and digital television signals. The Commission relied on the results of these tests in developing its DTV rules. It can be determined from the test results that the maximum undesired signal permissible from a lower adjacent channel LoJack transmitter should be at least 10 dB higher for adequate DTV reception than for analog TV reception.[4] The SVRS power increases that have been proposed in this proceeding are well below 10 dB. It follows, therefore, that even if the power increases LoJack has proposed are adopted, DTV signals will enjoy greater protection than analog signals enjoy now under the power levels that are currently permitted.

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and the ABC Owned Television Stations ("ABC").

[2] MSTV/NAB Comments at 4.

[3] *See* Statement of Hammett & Edison, attached to MSTV/NAB Comments at 1-2.

[4] *See* technical statement of du Treil, Lundin & Rackley ("DTR Technical Statement"), attached hereto, at 1.

The tests on which the 10 dB improvement is based, moreover, overstate the extent to which DTV Channel 7 reception is susceptible to interference from SVRS operations. The analog television signals on which the tests were conducted have greater potential to interfere with DTV reception than SVRS signals do because: (1) "[a] lower adjacent channel analog NTSC signal has its frequency modulated (FM) aural carrier removed only 250 kHz from the lower edge of the desired TV station's channel, whereas a LoJack base station's signal is removed 925 kHz from the lower edge of the desired channel 7 TV station's signal"; and (2) "the TV Aural occupied spectrum is at least 50 kHz whereas the LoJack occupied spectrum is 20 kHz or less."[5] Accordingly, converting Channel 7 television stations from analog to digital operations should in practice produce more than 10 dB of additional margin.

III. THE PROPOSED POWER INCREASES ARE NEEDED TO COMPENSATE FOR NARROWER CHANNELS.

MSTV/NAB argues that LoJack has not explained why a decrease in SVRS bandwidth from 20 kHz to 12.5 kHz warrants the power increases that LoJack is seeking for SVRS base stations and VLUs.[6] ABC takes this argument one step further, asserting that power should be reduced because a narrower SVRS bandwidth will improve elements of LoJack's performance by approximately 2 dB.[7]

The technical analysis that LoJack submitted with its initial comments shows these objections to be moot or misplaced. LoJack showed that, even after the 2 dB noise reduction that is attributable to using a narrower bandwidth is taken into account, the adverse impact on system performance from converting to narrower channels will be up to 7 dB, and that the 2.2 dB and 3

[5] DTR Technical Statement at 2.
[6] MSTV/NAB Comments at 5; Statement of Hammett & Edison at 1.
[7] ABC Comments at 3; Engineering Statement attached to ABC Comments at 10.

dB power increases that LoJack has sought for SVRS base stations and VLUs will only partially compensate for this degradation.[8]

IV. THE RECORD SUPPORTS ELIMINATING THE CHANNEL 7 INTERFERENCE STUDY REQUIREMENT.

The other parties raise multiple objections to the proposal for eliminating the requirement to submit a formal Channel 7 interference study with every application for an SVRS base station. These objections are without merit.

At the outset, LoJack notes that adoption of the interference study requirement was a conservative measure. In the Notice of Proposed Rulemaking in which the Commission proposed allocating frequencies to the SVRS service, it recognized that "private land mobile stations have been operating even closer in frequency to TV channel 7 than the frequency … [proposed for] stolen vehicle recovery systems" and that these land mobile systems were authorized to operate "without any restrictions to protect channel 7 operations."[9] Although caution may have been in order when the SVRS service was new, the Commission now has a twenty year record rely on. During that time, there has not been a single example of objectionable interference to Channel 7 reception from SVRS operations. Accordingly, the requirement for a formal interference study has outlived whatever usefulness it may have had at the inception of SVRS operations.

MSTV/NAB seeks to retain the formal study requirement based on what it characterizes as "critical distinctions between analog television service and digital service."[10] As shown above, however, the most critical distinction between analog television and digital television is

[8] *See* LoJack Comments, Attachment A.

that digital television is less susceptible to interference. LoJack has demonstrated that the improved performance characteristics of digital signals more than compensate for the power increase that LoJack is seeking. Accordingly, interference potential will decrease as Channel 7 television stations convert to digital operations. This diminished potential for interference supports eliminating the interference study requirement, not retaining it.

ABC and MSTV/NAB question whether the interference protection criteria that the Commission adopted for SVRS applications, and the studies that LoJack has submitted in accordance with those criteria, are sufficient to protect Channel 7 viewers.[11] This objection is untimely in the extreme. The Commission adopted its interference protection criteria many years ago, and the time long has passed for asking the Commission to reconsider them.[12]

MSTV/NAB argues for retention of a formal interference study requirement based on the Commission's statement in the NPRM that it is better to address the potential for interference before it occurs than after it occurs.[13] As LoJack explained in its initial comments, it agrees with this principle, but believes that it can be adhered in a less formal manner. In particular, the Commission can make clear, in connection with an elimination of the formal interference study

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[9] *Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Stolen Vehicle Recovery Systems*, Notice of Proposed Rulemaking, 3 FCC Rcd 7195 at ¶ 13 & n. 10.

[10] MSTV/NAB Comments at 3.

[11] ABC Comments at 7-8; MSTV/NAB comments at 2. ABC also suggests that the interference studies submitted by SVRS applicants are not fully compliant. ABC Comments at 7-8. . These interference studies, however, use time tested methodology to identify areas of potential interference; provide population counts for the affected areas; and commit to mitigation if interference arises, which it never has. The Commission has accepted the interference studies time and again, and there is no basis for ABC's complaints.

[12] *See* 47 C.F.R. § 1.429(d) (petitions for reconsideration of an order in a rulemaking proceeding must be filed within 30 days of the date of public notice of the order). MSTV/NAB also resurrects a criticism of the Micrologic Report that was first made years ago in the original SVRS proceeding. Compare Statement of Hammett & Edison at ¶ 8 ("the Micrologic Report was based on median receiver performance") with *Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Stolen Vehicle Recovery Systems*, Report & Order, 4 FCC Rcd. 7558, 7560 ("MST … notes that the [Micrologic] Report was based on the median values for television receiver interference rejection characteristics."). The Commission rejected MSTV's criticism back then, *see id.* at n. 22 ("[t]hese [median] values appear to be reasonable"), and there is no basis for revisiting the Commission's determination.

[13] MSTV/NAB Comments at 2.

requirement, that SVRS applicants must continue to locate their base stations with interference considerations in mind, and must continue to have plans in place, if more than a *de minimis* number of residences would be affected by a base station, to control interference and to make such adjustments in affected TV receivers as may be necessary.

ABC maintains that a formal interference study requirement is needed because Channel 7 viewers, who are not necessarily conversant with the LoJack system and the frequencies on which it operates, cannot be expected to complain if they are subject to interference.[14] This argument is a red herring. Viewers may not know the source of interference they are subject to, but they know enough to complain to their local television station or cable operator if interference becomes an issue. Television station owners and cable operators are well versed in the ways of the Commission and know how to bring interference matters to the attention of the appropriate authorities.

MSTV/NAB questions whether the use of notch filters, which is one of the methods that SVRS applicants have stated would be used in the event there were interference to Channel 7 television reception, can be effective in the case of digital television signals.[15] LoJack is in the process of reviewing the performance characteristics of commercially available notch filters to determine their suitability in a digital television environment. LoJack notes, however, that there are alternative means for mitigating interference if notch filters are determined to be less than

[14] ABC Comments at 7.
[15] MSTV/NAB Comments at n. 9; Statement of Hammett & Edison at 4.

completely effective.[16] In any event, the ultimate risk is on the SVRS licensee, which must shut down its base station if it does not eliminate interference to Channel 7 reception.[17]

Finally, CDE asserts that SVRS applicants should be subject to a formal interference study requirement because noncommercial educational FM ("NCE") stations are subject to such a requirement in the case of potential interference to Channel 6 TV reception.[18] CDE attaches too much significance to this fact. Although CDE's characterization of the requirements for NCE stations is technically accurate, CDE overlooks multiple differences between the circumstances that are applicable to NCE and SVRS stations, including the facts that: (1) NCE stations may operate at significantly higher power than SVRS stations; and (2) NCE stations may operate on frequencies that are much closer to TV Channel 6 than SVRS stations are to TV Channel 7. Each service must be evaluated on its own merits, and the requirements for a different service should not be blindly applied to the SVRS.

V. THE RECORD SUPPORTS THE PROPOSED DUTY CYCLE REVISIONS.

ABC objects to the duty cycle limit changes that have been proposed in this proceeding on four grounds. LoJack refutes below each of ABC's contentions.

First, ABC claims that "[n]either LoJack nor the Commission has pointed to any significant change since 2002 that would justify changing the duty cycle limits."[19] This claim is demonstrably untrue. Subsequent to 2002 the Commission adopted requirements under which

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[16] For example, an SVRS licensee can pay for a cable television or DBS subscription for an affected viewer, thereby eliminating the viewer's reliance on over-the-air reception, or can buy the viewer a television set with better interference rejection performance than the set the viewer is using.
[17] *See* 47 C.F.R. § 90.20(e)(6)(iii).
[18] CDE Comments at 2.
[19] ABC Comments at 4.

LoJack, in order to accommodate the large installed base of 20 kHz equipment that is in the field, will need to operate side by side 20 kHz and 12.5 kHz systems for many years to come.[20]

Second, ABC asserts that there are "lingering questions whether the present duty cycle limits adequately protect channel 7 operations."[21] These questions, however, were resolved many years ago, when the Commission adopted SVRS rules. There is no basis for revisiting the matter, particularly in light of the fact that LoJack's system has been operating ever since without causing objectionable interference to Channel 7 reception.

Third, ABC maintains that the Commission should not take comfort in the fact that, under the existing duty cycle limits, there have been no interference complaints. ABC believes that the absence of complaints "at most … demonstrates that those experiencing interference do not know the cause of such interference."[22] As discussed in Section IV above, however, it is not necessary for a television viewer to know the source of interference in order for an interference issue to come to the Commission's attention. A viewer experiencing interference may not know to complain to LoJack, but certainly can complain to a Channel 7 or cable system operator that will be well acquainted with the ways of making interference concerns known at the Commission.

Fourth, ABC asserts that duty cycle limits will assume greater significance as television stations convert to digital operations because, in its view, "DTV transmissions likely are more

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[20] *See* LoJack's initial comments at 2. *See also See Amendment of Parts 2 and 90 of the Commission's Rules to Provide for Narrowband Private Land Mobile Radio Channels in the 150.05-150.8 MHz, 162-174 MHz, and 406.1-420 MHz Bands that are Allocated for Federal Government Use*, Report and Order, ET Docket No. 04-243, 20 FCC Rcd 5793 (2005), *Erratum*, 20 FCC Rcd 9882 (OET 2005).

[21] ABC Comments at 4.

[22] ABC Comments at 5.

susceptible to interference than analog television transmissions."[23] LoJack has thoroughly addressed this issue in Section II of these reply comments, and has shown that converting to digital operations will give television stations 10 dB or more of additional interference protection.

VI. NAB/MSTV MISCHARACTERIZES THE SIGNIFICANCE OF THE NUMBER OF LICENSED MOBILES.

The engineering statement that is attached to the MSTV/NAB Comments makes the claim that large numbers of mobile SVRS transmitters pose the threat of a "steady-state or near steady state interfering signal."[24] It is further suggested in the engineering statement that this signal could make it necessary to mitigate interference of "thousands or tens of thousands of viewers" within the range of a base station.[25]

MSTV/NAB's claim is misplaced. MSTV/NAB bases its claim on the maximum numbers of mobile stations that are authorized under some SVRS licenses. MSTV/NAB has overlooked the fact that virtually all of the mobile units are in a silent mode virtually all of the time. The only mobile units that transmit are the ones installed in a vehicle that has been reported stolen. On any given day, on average approximately 40 mobile units are activated in the portion of the United States in which LoJack's system is operated, which is comprised of 26 states and the District of Columbia, and which accounts for approximately two thirds of the vehicle sales and vehicle thefts in the country. Accordingly, there is no basis for MSTV/NAB's suggestion that thousands of mobile units would be transmitting at the same time.

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[23] ABC Comments at 6.
[24] Statement of Hammett & Edison at 3. *See also* Comments of MSTV/NAB at 2-3 (asserting that "the fact that some SVRS applications have requested authority for hundreds of thousands of VLU transmitters … [is] enough to cast doubt on the assumption that signals from VLU transmitters are unlikely to be a significant interference threat").
[25] Statement of Hammett & Edison at 4.

VII. THE RECORD SUPPORTS EXPANDING THE SVRS SERVICES THAT ARE PERMITTED.

MSTV/NAB and ABC raise the specter of increased interference if LoJack's proposal to expand the uses that are permitted under Section 90.20(e)(6) of the rules is adopted.[26] MSTV/NAB characterizes LoJack's proposal as one that would "intensify dramatically the use of this [SVRS] spectrum" and would lead to "a plethora of additional services" that would "fundamentally change the band's use."[27]

These assertions are alarmist and false. As discussed in LoJack's initial comments, the proposed additional uses are narrowly circumscribed, and in particular they all involve activation, tracking, and location communications, under the control of law enforcement entities, in response to an emergency event. In no way can LoJack's proposal fairly be characterized as one for "general tracking and monitoring."[28]

Moreover, the number of mobile units in operation at any given time will remain small. As discussed above, each day on average approximately 40 mobile units are activated. Even if the number of activations were to increase to several times that figure as a result of an expansion in permissible services, the number of mobile units in operation would remain small, and in almost all locations there would be no mobile units in operation at any given time.[29]

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[26] MSTV/NAB Comments at 5; ABC Comments at 8.
[27] MSTV/NAB Comments at 5.
[28] Statement of Hammett & Edison at 5.
[29] The fact that only minimal numbers of mobile units are – and will continue to be – in operation at any given time also alleviates the concern expressed by ABC, in the Engineering Statement that is attached to its Comments (at 9), that expanding permissible SVRS uses could affect the robustness of LoJack's system. Various proposals in this proceeding to modify the technical rules for the SVRS service, moreover, will (if adopted) enhance system robustness.

CONCLUSION

For the reasons stated herein and in LoJack's initial comments, the SVRS rule changes proposed in the NPRM, as modified by the refinements suggested in LoJack's initial comments, should be adopted.

Respectfully submitted,

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ATTACHMENT

TECHNICAL EXHIBIT
IN SUPPORT OF REPLY COMMENTS IN WT DOCKET NO. 06-142
AMENDMENT OF SECTION 90.20(e)(6) OF THE COMMISSION'S RULES

This Technical Exhibit was prepared on behalf of the LoJack Corporation, the Petitioner in WT Docket No. 06-142, *Amendment of Section 90.20(e)(6) of the Commission's Rules*.

Micrologic Interference Report

The comments filed by MSTV/NAB and ABC suggest that testing is required to determine the impact on the Channel 7 interference analysis of converting from analog operations to digital operations. There already has been extensive testing, however, on the differences in susceptibility to interference of analog television signals and digital television signals. In fact, the FCC's DTV rules are based in part on the results of those tests. As discussed in my previous technical statement, it is possible to determine, based on the DTV test results, that the maximum, undesired signal permissible from a lower adjacent channel LoJack transmitter should be at least 10 dB higher[1] for adequate DTV reception than for analog TV reception.[2]

[1] As shown in Table 2, *Comparison of Interfering Signal for Lower Adjacent Channel LoJack Signal*, contained within the Technical Exhibit provided in LoJack's comments in this proceeding, this 10 dB improvement takes into account the lower minimum desired station field strength value of a DTV station (36 dBu) versus an analog station (56 dBu).
[2] LoJack initiated interference is defined for analog reception as "just perceptible interference," and for digital reception as threshold of visibility (TOV).

Although the DTV test results were based on having an analog television signal, rather than a LoJack signal, as the undesired signal, for various reasons a LoJack signal has less potential for interfering with DTV reception than an analog television signal does. A lower adjacent channel analog NTSC signal has its frequency modulated (FM) aural carrier removed only 250 kHz from the lower edge of the desired TV station's channel, whereas a LoJack base station's signal is removed 925 kHz from the lower edge of the desired channel 7 TV station's signal. Furthermore, the TV Aural bandwidth is at least 50 kHz whereas the LoJack bandwidth is 20 kHz or less. Based on this increased frequency separation and smaller bandwidth, a DTV receiver should provide better performance in rejecting out-of-band emissions from a LoJack signal 925 kHz removed from the lower channel edge than in rejecting out-of-band emissions from an analog TV aural signal located only 250 kHz from the lower channel edge.

It is important to remember that the LoJack occupies only a small portion of a TV Channel bandwidth with a significant "guard" band extending to the adjacent Channel 7 frequency edge. The interference studies reviewed thus far with these LoJack signal type characteristics (i.e. NTSC aural carrier) indicate a very large desired-to-undesired signal ratio due to the greater rejection of adjacent channel emissions of digital receivers compared to analog receivers. The LoJack spectrum will be 25 kilohertz or less

in bandwidth on a frequency located almost 1 Megahertz away from the adjacent channel lower band edge.[3] The occupied spectrum for an ATSC digital signal is 5380 kilohertz (5.38 MHz). Therefore, the LoJack occupied spectrum will 0.5% or less of an associated ATSC digital signal residing in the same spectrum.

There appears to be some confusion on the measured interference levels as reported within the *Micrologic Report*.[4] As reported in the Report, the median undesired-to-desired ratio (U/D) for just perceptible interference varies from +8 dB to +11 dB, dependent upon the signal strength of the desired signal. Therefore, if a desired-to-undesired (D/U) unit is specified, the ratios would be defined as –8 to -11 dB.

Polarization Discrimination Issue

As noted, LoJack wishes to maintain the use of a 10 dB polarization discrimination factor in analyzing interference to Channel 7 stations, as discussed within the *Micrologic Report*, since LoJack base stations transmits with a principal vertical-only polarization and DTV reception is defined as horizontal-only polarization.[5] Additionally, it appears the IEEE Standard 802.22 Committee, which is

[3] The required reduction in the LoJack bandwidth, to 12.5 kHz, is not expected to increase the interference impact to a TV-7 station.
[4] LoJack in 1985 submitted to the Commission results of testing done by *Micrologic, Inc*. on analog TV receiver performance on channel 7 in the presence of a LoJack signal operating on 173.075 MHz, "Test Report on Potential for Interference to the Reception of Television Channel 7 Signals by Lo-Jack Transmissions", Micrologic, Inc., Watertown, MA, October 1985.
[5] See OET Bulletin No. 69, Longley-Rice Methodology for Evaluating TV Coverage and Interference, February 6, 2004.

developing a standard for a cognitive radio-based devises operating in TV/DTV allocated spectrum, is also considering the use of an even greater polarization discrimination factor of 14 dB in characterizing the interference to digital television receivers.[6]

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[6] See *ex parte* presentation to FCC by the IEEE 802.22 Committee in WT Docket 04-186, filed October 3, 2005.